Claims

1. An optoelectronic device comprising:

a dielectric layer or a semiconductor layer sandwiched between electrode structures, wherein at least one of the electrodes is substantially metal comprising and at least semi-transparent,

a periodic microstructure in contact with at least one surface of the substantially metal comprising and at least semi-transparent electrode,

characterised in that the structure and positioning of the periodic microstructure is such that:

surface plasmon (SP) polariton modes supported mainly at the interface between the dielectric layer or semiconductor layer and the metal comprising, semi-transparent electrode

are substantially scattered into propagating light, said propagation being out of the plane of the dielectric layer or semiconductor layer and the metal comprising, semi-transparent electrode interface.

2. A device according to claim 1 wherein the periodic microstructure is selected from the following structures

- the metal comprising electrode comprises a grating type structure on each of its surfaces, wherein the relationship between the microstructure of the two metal comprising surfaces is such that they are out of phase by π radians or substantially π radians;
- a grating type structure present only at the interface between the metal comprising electrode and the semiconductor or dielectric layer;
- a grating type structure present at the metal comprising electrode/air interface only;
- a further dielectric layer present at the surface of the metal comprising electrode remote from the dielectric/semiconductor layer, on which is present a grating type structure.

3. A device according to claim 2 wherein the periodic microstructure is selected from

a grating type structure present at the metal comprising electrode/air interface only wherein there is present an encapsulating layer on the electrode.

4. A device according to any of claims 1-3 wherein the periodic microstructures are a periodic sequence of valleys and hills, or a periodic sequence of grooves.

5. A device according to any of claims 1-3 wherein the periodic microstructures are a grating type structure which is a series of holes in the metal comprising electrode.

6. A device according to any of claims 1-5 wherein the periodic microstructures are periodic in more than one direction on the surface.

7. A device according to any of claims 1-6 wherein the periodic microstructures are sub-wavelength.

8. A device according to any of claims 1-7 wherein the metal comprising electrode is an aluminium cathode.

9. A device according to any of claims 1-8 wherein the device is chosen from a light emitting diode, a photovoltaic cell or a photodiode.

10. A device according to claim 9 wherein the light emitting diode is an organic light emitting diode.